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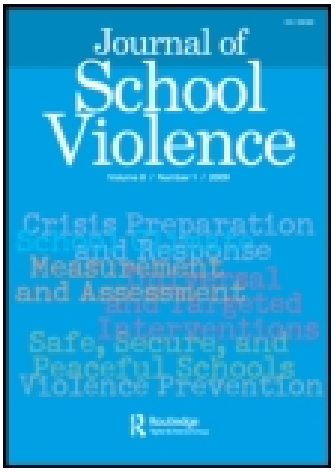

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The Impact of Bullying Perpetration and Victimization on Later Violence and Psychological Distress: A Study of Resilience Among a Scottish Youth Cohort

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The Impact of Bullying Perpetration and Victimization on Later Violence and Psychological Distress: A Study of Resilience Among a Scottish Youth Cohort

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This article examines the impact of bullying between age 13 and 16 years on negative outcomes at age 17 years, taking into account various resilience factors at the individual, family, and community level. Using longitudinal data from the Edinburgh Study of Youth Transitions and Crime, a prospective cohort study of around 4,300 young people in Scotland, the impact of bullying perpetration on later engagement in violence and the impact of bullying victimization on later psychological distress are modeled. The analysis finds significant resilience factors, which reduce violence and psychological distress in late adolescence; however, even when controlling for such factors, both bullying perpetration and bullying victimization are strongly predictive of later negative outcomes. The findings support policy responses that implement early and effective interventions within schools to both prevent bullying and improve individual resilience to its long-term effects.

KEYWORDS bullying, perpetration, victimization, resilience, adolescence, longitudinal, Edinburgh Study

INTRODUCTION

Over the last two decades, bullying has been increasingly recognized as a significant and widespread problem among children and young people. Surveys across different countries indicate that the prevalence of bullying

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varies greatly, with estimates ranging from 8.6% to 45.2% among boys, and from 4.8% to 35.8% among girls (Craig et al., 2009). Nevertheless, in a broad review of 24 countries, P. K. Smith et al. (1999) found a high degree of similarity in the structural features of the problem. In most jurisdictions, bullying tends to increase steadily in the early years of education, peaking around age 12–14, before tapering off in later adolescence. However, longitudinal studies have shown that the long-term impact on those who experience bullying, either as a perpetrator or a victim, can include a broad range of behavioral and psychological adjustment problems. Young people who bully others tend to be at greater risk of involvement in general delinquency, violent offending, criminal convictions, and academic failure (Bender & Losel, 2011; Farrington & Ttofi, 2011a; Kim, Leventhal, Koh, Hubbard, & Boyce, 2006). While the victims of school bullies suffer problems such as anxiety, depression, low self-esteem, self-harm, and parasuicidal behavior (Arseneault, Bowes, & Shakoor, 2009; Barker et al., 2008; Sourander et al., 2006; Ttofi, Farrington, Losel, & Loeber, 2011). Furthermore, those who both bully and are bullied by others (so-called "bully-victims") are at greatest risk of experiencing these types of negative outcome in later life (Arseneault et al., 2006; Barker et al., 2008).

While experience of bullying significantly increases the risk of adjustment problems, such negative outcomes are not inevitable and, indeed, many young people demonstrate relatively positive behavioral or psychological outcomes despite their level of risk. Rutter (2006) uses the term "resilience" to describe such individuals, and highlights the importance of understanding not just the individual factors but the mechanisms that underpin the huge variation between individuals in their responses to the same types of experience. While much is known about the factors that increase the risk of bullying, both as victims and perpetrators, far less is known about the factors that indicate resilience to negative outcomes (Baldry & Farrington, 2005) or the causal processes by which they operate. Yet, a paradigm shift seems apparent within criminological research in general, and the bullying framework in particular, which engenders a more holistic approach to understanding both risk and resilience (Farrington & Ttofi, 2011b, forthcoming). Three levels of protection are increasingly considered worthy of attention: (a) *individual level attributes,* including gender (Underwood & Rosen, 2011), school attainment (Woods & Wolke, 2004) and personality characteristics such as self-esteem, impulsivity, and loneliness (Marini, Dane, & Bosacki, 2006; Patchin & Hinduja 2010); (b) *family level characteristics,* including family stability, socioeconomic status (Arsenault et al., 2010) and positive parenting (Bowes, Maughan, Caspi, Moffitt, & Arseneault, 2010); and (c) the *social context or community level,* including low crime, disadvantage and disorganization in the neighborhood (Mykota & Muhajarine, 2005). Each of these levels represents a potential range of resilience factors, which may

directly protect against the negative effects of bullying or may interact with other risk factors to mediate their negative effects.

THE SCOTTISH CONTEXT

The Health Behavior in School-Aged Children (HBSC) survey 2005/06 found that Scotland had a relatively low rate of bullying, with 15% prevalence of any bullying for boys and 12% for girls, which was similar to many of northwest European neighbors (Craig et al., 2009). However, an earlier sweep of the study found that while its bullying rate was low, Scotland had a relatively high rate of fighting when compared cross-nationally (Todd et al., 2004). Concern about bullying in Scotland increased during the 1990s and led to the establishment of an Anti-Bullying Network in 1999, which aimed to provide free antibullying support to school communities. The work of the Network fed into government policy and, in 2010, the Scottish Government launched a national strategy aimed at ensuring all relevant agencies and communities worked in partnership to develop a holistic approach to antibullying in Scotland. The strategy recognized that bullying behavior had "potential short-term impact and long-lasting consequences" and that "children and young people who knew themselves well and had self-respect were more likely to be resilient and strong, cope with change and challenge in life and make good choices" (Scottish Government, 2010, p. iv); however, the document makes no specific reference to what these short- or long-term impacts might be and makes little effort to define resilience or specify what forms it might take. Research in Scotland has highlighted some of the characteristics of those who experience bullying and the associated risk factors (Alexander et al., 2004a, 2004b). Analysis of longitudinal data has also identified a strong connection between increasing bullying trajectories and high delinquency and self-harm in adolescence (Barker, Arseneault, Brendgen, Fontaine, & Maughan, 2008). However, there has been no research on the long-term impacts of bullying on young people's later life outcomes, which takes account of potential resilience factors. This article, therefore, aims to address that gap.

AIMS AND METHOD

The primary aim of this article is to identify the impact of bullying during early adolescence on longer term outcomes, taking into account various potential resilience and protective factors at the individual, family and community level. Experiences of bullying others as a perpetrator and being bullied as a victim are considered separately and different negative outcomes

are studied for each. Analysis was conducted using data from the Edinburgh Study of Youth Transitions and Crime, a prospective longitudinal study of pathways in and out of offending conducted in Scotland's capital city (D. J. Smith & McVie, 2005). The analysis was undertaken in three stages. Firstly, regression modeling was used to test the effect of being a bullying perpetrator between the ages of 13 and 16 on engagement in violent behaviors at age 17; and the impact of being a bullying victim over the same period on psychological distress at age 17. Secondly, the effect of early bullying experience on these two negative outcomes is tested after controlling for a range of potential resilience factors within the regression models, the aim being to determine whether early experience of bullying still has a significant effect on these two later negative outcomes. Finally, interaction effects are included in the models to determine whether any of the potential resilience factors are interactive protective factors.

Sample

The sample consists of a cohort of around 4,300 young people who participated in the Edinburgh Study between 1998 and 2004 (Smith & McVie, 2003). A census approach was used, with all secondary schools in Edinburgh being invited to participate and all parents being asked to consent to their children taking part. The final cohort consisted of around 92% of the total population of young people who were enrolled to start secondary school, at around the age of 12, in 1998. The cohort was surveyed annually between the ages of 12 and 17, whereby self-completion questionnaires were administered to young people by trained researchers. Response rates ranged from 96% at age 12 to 81% at age 17 (McAra & McVie, 2007). In addition to self-report questionnaire data, the Edinburgh Study collected data from a broad range of other sources, including school records, pastoral teachers, parents and official records held by social workers and youth justice agencies.

Measures

Bullying measures

Questions on bullying behavior were included in the questionnaire over four sweeps, between the ages of 13 and 16. Retrospective questions about the last school year were asked, which means that data on bullying broadly corresponds to the first 4 years of secondary education for the cohort. The questions were developed in collaboration with the Scottish Anti-Bullying Network established in 1999 and adapted from the Olweus Bully/Victim Questionnaire (1993). In line with Olweus's work, the questions used to measure bullying were intended to capture all three main elements of the definition of bullying: the intention to harm the victim, the repetitive

nature of bullying, and the imbalance in power between the victim and the perpetrator (Solberg & Olweus 2003).

The measures of bullying perpetration and bullying victimization used in this article are composite scores based on four aspects of bullying behavior. For the perpetration measure, cohort members were asked how often they had done any of the following things to someone that they knew (not including siblings): "ignored them on purpose or left them out of things," "said nasty things, slagged them or called them names," "threatened to hurt them," or "hit, spat or threw stones at them." For the victimization measure, they were asked how often someone else had done each of these things to them on a 4-point scale (3 = *most days*, 2 = *at least once a week*, 1 = *less* than once a week, or 0 = *never*). The resultant scores ranged from 0 to 12 representing a measure of frequency of bullying perpetration and victimization during the previous year for ages 13, 14, 15, and 16. The only exception to this is the bullying perpetration measure at age 13, which asked whether they had done each of these things (*yes*/*no*), so provides prevalence rather than a frequency measure.

A summary of the bullying measures is presented in Table 1, restricted to only those who participated in the study at age 17 (n = 3,861) since the outcome measure was taken from this sweep of the survey. Table 1 shows that the average score on both the bullying perpetration and victimization measures was low (i.e., most people reported either no or infrequent experience of bullying); however, the variance is comparatively high, which suggests that there was a wide range of responses. The Cronbach's alpha values show the internal consistency or reliability of the items that were combined to construct the bullying measures. The alpha value is lowest for

TABLE 1 Summary of the Bullying Perpetration and Victimization Measures

Bullying measures	*N*	Range	*M*	*SD*	Cronbach's alpha
Scale of bullying at age 13[a]	3,675	0–4	1.67	1.35	.69
Scale of bullying at age 14	3,755	0–12	2.54	2.41	.74
Scale of bullying at age 15	3,754	0–12	2.20	2.22	.74
Scale of bullying at age 16	3,829	0–12	1.79	2.03	.71
High bully at age 13–16[b]	3,063	0–1	0.25	0.44	
Scale of victimization at age 13	3,718	0–12	1.52	2.40	.81
Scale of victimization at age 14	3,807	0–12	1.44	2.19	.79
Scale of victimization at age 15	3,757	0–12	1.23	2.07	.80
Scale of victimization at age 16	3,849	0–12	0.96	1.87	.80
High bully victim at age 13–16[b]	3,174	0–1	0.25	0.43	

[a]The scale of bullying at age 13 is based on prevalence whereas measures at age 14, 15, and 16 are based on frequency.

[b]The "high bully at age 13–16" and "high bully victim at age 13–16" measures were constructed by creating composite measures of bullying and victimization from the scales at ages 13, 14, 15 and 16 and then creating a binary variable with the highest quartile in each measure = 1.

the bullying perpetration measure at age 13 (which is probably explained by its slightly different composition compared to the others); and generally, the values are lower for the bullying perpetration than the victimization measures. However, on the whole, the alpha values suggest that the bullying variables have good internal consistency and are reliable measures of bullying perpetration and victimization. In order to avoid autocorrelation by entering all the measures into the models, two final composite measures were created for bullying victimization and perpetration by combining the respective scores across each time point into one overarching score and then transforming this into a binary measure. The top quartile of bully victims and bully perpetrators were then given a score of 1, while the remaining respondents were coded 0. This ensured that those who were involved in the most extreme bulling were modeled against the others.

Outcome measures

The outcome measure for bullying perpetration was self-reported involvement in violence at age 17. Violence at age 17 was selected as the outcome variable, as opposed to a more general measure of offending, due to the strong association between bullying and self-reported violence identified by Farrington and Ttofi (2011a) at approximately the same age points. Respondents at age 17 were asked whether they had committed any of the following five acts of violence during the previous year: "hit or picked on someone because of their race or skin color"; "hit, kicked, punched or attacked someone with the intention of really hurting them"; "stolen money or property that someone was holding, carrying or wearing using threats or actual force or violence"; "hurt or injured any animals or birds on purpose"; and "carried a knife or other weapon for protection or in case it was needed in a fight." Those who indicated that they had done any of these things were asked to say how often they had done so in order to create a composite measure of frequency of violence; however, the measure was extremely skewed with 79% of respondents reporting that they had not done any of these things at age 17. Consequently, a binary measure was created indicating whether or not the respondent had reported any violence at age 17, with 21% ($n = 758$) reporting at least one incident.

The outcome measure for bullying victimization was *psychological distress at age 17*, measured using a reduced version of the Hospital Anxiety and Depression Scale (HADS) developed by Zigmond and Snaith (1983) and commonly used by doctors to measure anxiety and depression among patients. The HADS consists of 14 items, seven relating to anxiety and seven relating to depression. Due to constraints on questionnaire length, only three each of the anxiety and depression items were used in the Edinburgh Study, and so this measure is used as a unidimensional measure of psychological distress at age 17. The three measures of depression were: "I feel cheerful," "I

look forward with enjoyment to things," and "I can laugh and see the funny side of things." The three measures of anxiety were: "worrying thoughts go through my mind," "I get sudden feelings of panic" and "I can sit at ease and feel relaxed." Each item had four responses: *most of the time, sometimes, not very often,* and *never*. The positively phrased items were coded 0 for *most of the time* through to 3 for *never* (and vice-versa for the negative items), which resulted in a score from 0 to 18 measuring degree of psychological distress. This measure had a mean of 4.96, which indicates that the majority of youths scored very low on this measure of distress, and a standard deviation of 2.60, which indicates a relatively low level of variation. Cronbach's alpha value for the scale was .68, which is acceptable when conducting reliability analysis for only six items (Hair, Anderson, Tatham, & Black, 1998).

Resilience measures

In line with the proposal that criminology should shift its attention from risk factors towards promotive and protective factors, in an attempt to inform policies designed to intervene effectively with those who experience bullying (Farrington & Ttofi, 2011b), this article focuses on 15 resilience variables measured at three different levels: individual, family, and community. The explanatory factors were coded as binary variables, with continuous measures or scales divided into the most protective quartile versus the remainder, as recommended by Farrington and Ttofi (forthcoming). A summary of the resilience measures is provided in Table 2.

At the individual level, the potential resilience effects of the following attributes were tested:

- *gender*—coded 1 for female, 0 for male;
- *school attainment*—coded 1 for those who had achieved Higher or Further Education level of study by age 16, 0 for those who achieved only ordinary level or left school with no qualifications;
- teacher ratings of *positive attributes and prosocial behavior* based on a shortened version of the Strengths and Difficulties Questionnaire (Goodman, 1997; see also D. J. Smith et al., 2001)— coded 1 for respondents in the upper quartile, otherwise coded 0;
- *low impulsivity* based on a modified version of the Eysenck Impulsivity Scale (Eysenck & Eysenck, 1964)—coded 1 for respondents scoring in the lowest quartile for impulsivity, 0 for the other respondents;
- *low social alienation* based on a modified version of the Multidimensional Personality Questionnaire (Tellegen, 1982)—coded 1 for respondents scoring in the lowest quartile for social alienation, otherwise coded 0; and
- *high self-esteem* based on a modified version of the Rosenberg Self-Esteem Scale (Rosenberg, 1965)—coded 1 for respondents scoring in the upper quartile for self-esteem, otherwise coded 0.

TABLE 2 Summary of the Resilience Measures

Measures of resilience	*N*	Mean[a]	*SD*
Individual level			
Female	3,861	0.51	0.50
High school attainment	3,383	0.83	0.37
Positive/prosocial attributes[b]	3,578	0.32	0.47
Low impulsivity[b]	3,770	0.25	0.44
Low social alienation[b]	3,754	0.23	0.42
High self-esteem[b]	3,781	0.25	0.43
Family level			
Stable family structure	3,861	0.59	0.49
Good socioeconomic status	3,575	0.59	0.49
Low eligibility to free meals	3,861	0.82	0.38
Parental supervision[b]	3,521	0.28	0.45
Infrequent parent–child conflict[b]	3,812	0.28	0.45
Parental interest in education[b]	3,719	0.24	0.43
Community level			
Low economic deprivation[b]	3,538	0.28	0.45
High neighborhood stability[b]	3,538	0.27	0.44
Low neighborhood crime rate[b]	3,538	0.26	0.44

Note. Maximum *N* is 3,861 (i.e., the number of respondents at age 17).
[a]All resilience variables are binary so means are equivalent to the proportion of cases coded 1.
[b]Scale variables have been divided as far as possible into the most resilient quartile versus the remainder.

Resilience factors were also included based on the characteristics and dynamics of the family, based on data collected from the child self-reports and a survey of parents carried out when the cohort was age 15:

- *stable family structure* as measured by the child living consistently with both birth parents—coded 1 for living with both birth parents, 0 for living with only one or no birth parents;
- *good socioeconomic status* as defined by the head of household's occupational status—coded 1 for nonmanual occupation, 0 for manual occupation or unemployed;
- *noneligibility for free school meals* as a proxy measure for parental income—coded 1 for noneligibility for free meals, 0 for eligibility (indicating low income);
- *good parental supervision* and monitoring measured by three items taken from the Supervision/Involvement Scale of the Pittsburgh Youth Study (Loeber, Farrington, Stouthamer-Loeber, & van Kammen, 1998)—coded 1 for respondents scoring in the upper quartile for high level of supervision, otherwise coded 0;
- *infrequent parent-child conflict* as measured by how often the child reported arguing with parents about: "how tidy my room is," "what time I come home," and "what I do when I go out)—coded 1 for those who scored in the lowest quartile for parent-child conflict, and otherwise coded 0; and
- *parental interest in education* as measured by how often the child reported that their parents would: "check you've done your homework," "go to

parents' evenings," "help with problems at school" and "reply to school letters"—coded 1 for those who scored in the highest quartile for parental interest in education, and otherwise coded 0.

Finally, three *community level* resilience variables were included in the analysis based on data collected from the UK Census and Police Recorded Crime Statistics. Each child was assigned to one of 91 residential neighborhoods in Edinburgh based on their residential address and the following data were aggregated to neighborhood level (see McVie & Norris, 2006; D. J. Smith et al., 2001):

- living in an area of *low economic deprivation* was measured using data from the 2001 Census based on rates of unemployment, overcrowding, renting a home from the local authority and single parent households—coded 1 for those scoring in the lowest quartile for economic deprivation, otherwise coded 0;
- *high neighborhood stability* was measured using data from the 2001 Census based on rates of migration and percentage of the population aged between 10 and 25—coded 1 for those scoring in the highest quartile for neighborhood stability, otherwise coded 0; and
- living in an area with a *low neighborhood crime rate* was measured using the police recorded crime rate for all crimes per 1000 of the population within neighborhood—coded 1 for those living in the lowest quartile crime rate area, otherwise coded 0.

STATISTICAL ANALYSES AND RESULTS

Bullying Perpetration

A binary logistic regression model was constructed to determine the effect of bullying perpetration on later violence, since it was not possible to create either a normally distributed continuous scale or a suitable ordinal measure of violence. Thus, the model aimed to establish whether involvement in bullying as a perpetrator at ages 13, 14, 15, and 16 increased the probability of being engaged in violence at age 17. Table 3 presents the results of the three modeling stages in terms of the logit coefficients (see the Appendix for the equivalent results in terms of odds ratios). Stage 1 involved entering all four standardized bullying perpetration measures into the model in order to determine whether there was a combined effect of bullying over time. The results presented in Table 3 indicate that the composite bullying measure "high bully at age 13–16" significantly predicted later violent behavior at age 17. In other words, those who engage in persistent bullying in their early teens were at increased risk of being violent in later adolescence than those for whom bullying behaviors did not occur or were of short duration or frequency.

TABLE 3 Logistic Regression Model for Bullying Perpetration: Predicting Probability of Participation in Violence at Age 17

Independent variables included in the model	Stage 1		Stage 2		Stage 3	
	β	*SE*	β	*SE*	β	*SE*
Bullying measure[a]						
High bully at age 13–16 years	1.33***	(0.10)	0.84***	(0.13)	0.93***	(0.13)
Individual level resilience						
Female			−0.81***	(0.13)	−0.81***	(0.13)
High school attainment			−0.20	(0.16)	−0.20	(0.16)
Positive/prosocial attitudes			−0.41**	(0.14)	−0.43**	(0.14)
Low impulsivity			−0.63***	(0.17)	−0.64***	(0.17)
Low social alienation			−0.49**	(0.17)	−0.27	(0.19)
High self esteem			0.21	(0.15)	0.21	(0.15)
Family level resilience						
Parental interest in education			0.27	(0.15)	0.26	(0.15)
Parental supervision			−0.69***	(0.17)	−0.69***	(0.17)
Stable family structure			−0.35**	(0.12)	−0.35**	(0.12)
High socioeconomic status			−0.16	(0.13)	−0.17	(0.13)
Low eligibility to free school meals			0.11	(0.17)	0.12	(0.17)
Infrequent parent-child conflict			−0.41**	(0.15)	−0.44**	(0.15)
Community level resilience						
Low economic deprivation			−0.29*	(0.16)	−0.30*	(0.16)
High neighborhood stability			−0.13	(0.14)	−0.13	(0.14)
Low neighborhood crime rate			−0.15	(0.16)	−0.15	(0.16)
Interaction effects[b]						
High bully at age 13–16 years by low social alienation					−0.91*	(0.41)
Observations	3,063		2,292		2,292	
Pseudo R^2 (Nagelkerke)	.093		.203		.206	

Note. Unstandardized logit coefficients and standard errors (in parentheses) reported. [a]High bully at age 13–16 years = those in the upper quartile of a composite measure of bullying perpetration based on scales measured at each age.

[b]Only significant interaction effects reported.

*$p < .05$. **$p < .01$. ***$p < .001$.

At Stage 2 of the analysis, the resilience variables were added. This was done incrementally to determine the effect on the pseudo *R*-squared value; however, the results are presented together for convenience. The largest rise in the *R*-squared value occurred on entry of the individual level resilience measures (from .093 to .170), which indicates that this block of variables had the greatest impact on the dependent variable. The *R*-squared value increased moderately to .197 with the inclusion of the family level variables, and then increased only slightly to .203 for the final model, suggesting that the family level variables had a greater effect than the community level variables.

The results at Stage 2 indicated that being female increased resilience to violence at age 17, as did having a low score on the measures of impulsivity and social alienation. Those who were reported by teachers to exhibit

positive attitudes and prosocial attitudes at age 13 were also more resilient to later violence. At the family level, living in a stable family environment with both birth parents, being in the highest quartile for level of parental supervision and monitoring, and the lowest quartile for parent–child conflict also significantly reduced the probability of being violent at age 17. None of the resilience measures at the community level proved to be significant. It is particularly interesting that none of the resilience variables measuring affluence, either at the individual or the community level, proved to be significant in the model.

Interaction effects between the bullying perpetration variables and the resilience measures were tested at Stage 3; however, only one interaction proved to be significant. A negative interaction was found between being a high bully at age 13–16 years and low social alienation. The moderate effect size of this interaction (−0.910) indicates that the impact of being a bully in early life on later violence is moderated among those who have low social alienation, which means that strong social engagement and friendship networks could be a protective factor against later violence. Note in Table 3 that the social alienation measure stopped having a main effect within the model at Stage 3. This is illustrated in Figure 1, which shows that low bullies at age 13–16 years had very similar violence outcomes regardless of their experience of social alienation; whereas, high bullies who were not socially alienated were significantly protected against developing later violent behaviors compared to those who were highly alienated. The interaction effect only increased the *R*-squared value marginally, however; and

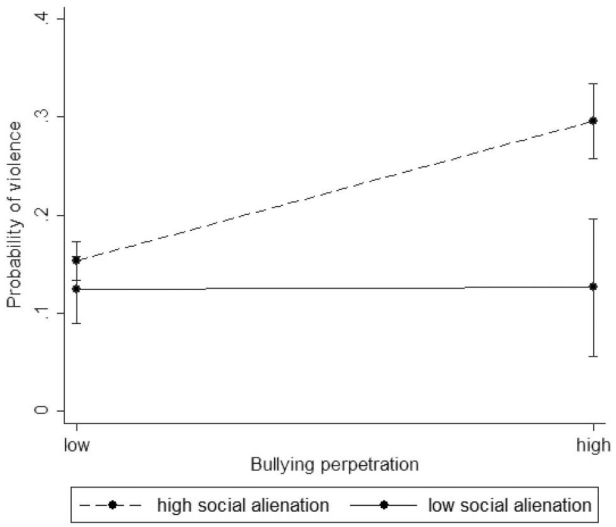

FIGURE 1 Interaction effect between bullying perpetration at age 13–16 years and social alienation in predicting participation in violence at age 17 years.

all the other variables that were significant at Stage 2 remained so at Stage 3. Most importantly, even when controlling for these resilience factors, early experience of bullying continued to significantly effect the probability of later participation in violence.

Bullying Victimization

The dependent variable for bullying victimization was psychological distress at age 17. This was a continuous variable ranging from 0 to 18 with a relatively normal distribution; therefore, a linear regression model was constructed to determine the effect of bullying victimization on later anxiety and depression. This model aimed to establish whether experience of being a '"high bully victim at age 13–16" increased an individual's score on the measure of psychological distress at age 17. The results of this modeling are presented in Table 4, in the same three stages as before. At Stage 1, only the measure of bullying victimization was entered into the model. This variable proved to be highly significant, which demonstrated that experiencing extreme bullying as a victim in the early teenage years had a profound effect on long-term mental health.

At Stage 2, the resilience factors were entered into the model incrementally to establish the impact of each set of predictors on the *R*-squared value. The *R*-squared values showed that the bullying victimization variable on its own explained about 5% of the variance of the dependent variable. On entry to the model, the individual level resilience factors increased the *R*-squared value to .114, thus improving the explanation of the variance by a further 6%; however, the addition of the family and community level variables improved the *R*-squared value further by less than 2%. Like bullying perpetration, therefore, early intervention would appear to be important in preventing significant psychological trauma and distress in later adolescence, although clearly there are other factors that are not being included in this model that need to be considered. In fact, as far as they can be compared, the resilience factors included in the model for bullying victimization were far less predictive of psychological distress than the previous model for bullying perpetration.

Only five of the 15 resilience variables proved to be significant in the model. At the individual level, being male was protective against psychological distress in late adolescence, which presents a very different picture to the bullying perpetration model. Those with high self-esteem and low social alienation were also significantly less likely to experience later anxiety and depression. The only significant family level variable was parental interest in education, which indicated that those youths whose parents had demonstrated greater engagement with the school system (perhaps as a result of the bullying victimization) were more resilient to later distress. In addition, young people living in the least economically deprived areas of Edinburgh

TABLE 4 Linear Regression Model for Bullying Victimization: Predicting Psychological Distress at Age 17

Independent variables included in the model	Stage 1		Stage 2		Stage 3	
	β	*SE*	β	*SE*	β	*SE*
Bullying measure[a]						
High bully victim at age 13–16 years	1.28***	(0.10)	1.04***	(0.12)	1.14***	(0.13)
Individual level resilience						
Female			0.55***	(0.11)	0.55***	(0.11)
High school attainment			0.15	(0.15)	0.13	(0.15)
Positive/prosocial attitudes			−0.16	(0.11)	−0.16	(0.11)
Low impulsivity			−0.05	(0.12)	−0.05	(0.12)
Low social alienation			−0.78***	(0.13)	−0.80***	(0.13)
High self esteem			−0.77***	(0.13)	−0.67***	(0.14)
Family level resilience						
Parental interest in education			−0.64***	(0.12)	−0.64	(0.12)
Parental supervision			0.20	(0.12)	−0.19	(0.12)
Stable family structure			−0.13	(0.11)	−0.13	(0.11)
High socioeconomic status			0.09	(0.11)	−0.10	(0.11)
Low eligibility to free school meals			−0.03	(0.15)	−0.04	(0.15)
Infrequent parent–child conflict			−0.09	(0.11)	−0.07	(0.12)
Community level resilience						
Low economic deprivation			−0.26*	(0.13)	−0.25*	(0.13)
High neighborhood stability			0.10	(0.11)	0.10	(0.11)
Low neighborhood crime rate			−0.21	(0.13)	−0.21	(0.13)
Interaction effects[b]						
High bully at age 13-16 years by low social alienation					−0.65*	(0.32)
Observations	3,159		2,361		2,361	
Pseudo R^2 (Nagelkerke)	.046		.130		.132	

Note. Unstandardized coefficients and standard errors (in parentheses) reported.

[a]High bully victim at age 13–16 years = those in the upper quartile of a composite measure of bullying victimization based on scales measured at each age.

[b]Only significant interaction effects reported.

*$p < .05$. **$p < .01$. ***$p < .001$.

demonstrated a strong degree of resilience to later mental health problems, which was different to the earlier model, in which community level affluence was not a significant protective factor in preventing later violence.

The inclusion of interactions between variables again yielded only one significant effect. A negative interaction with a moderate effect size of −0.648 was found between bullying victimization at age 13–16 years and self-esteem. The findings show that the impact of early bullying on later psychological distress is moderated among those who have high self-esteem in childhood. Both the high bully victim and self-esteem measures remained significant as main effects within the model, so both had an independent effect on later psychological distress. However, Figure 2 clearly illustrates

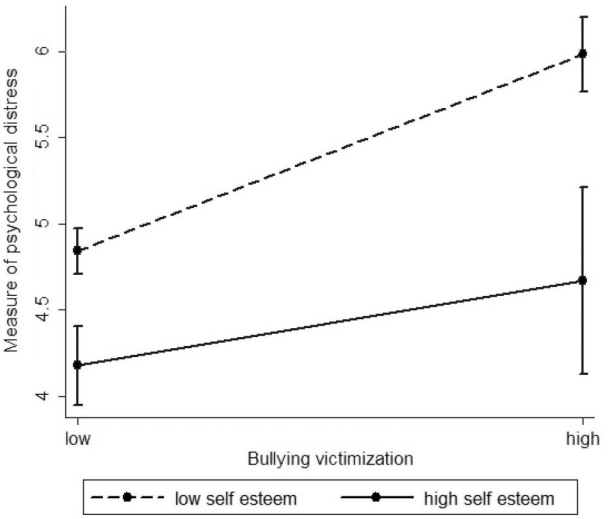

FIGURE 2 Interaction effect between bullying victimization at age 13–16 years and self-esteem in predicting psychological distress at age 17.

the protective effect of having high self-esteem among bully victims in terms of reducing their risk of later psychological distress. Overall, these findings have implications for ensuring that adequate attention is paid to mental resilience within schools and for implementing initiatives that work with young people, especially girls, to improve their own sense of self-worth, confidence, and esteem. As with the bullying perpetration model, the interaction effect only increased the *R*-squared value very marginally, so we must be cautious about interpreting it. Most importantly, even when controlling for these resilience factors, early experience of bullying as a victim continued to have a significant effect on the probability of psychological distress in later adolescence.

DISCUSSION

The findings from these preliminary analyses of the Edinburgh Study data on the impact of bullying on later outcomes highlight a number of key themes that are worthy of further exploration. One of these themes is gender, as it appears that young women are more resilient than young men to engaging in violence in late adolescence, while young men are more resilient to developing symptoms of anxiety and depression during this time period. Therefore, interventions that aim to reduce bullying in schools may need to take a gendered approach to building resilience since improving these longer term outcomes is likely to require different emphasis.

The resilience measures were more effective in terms of predicting reductions in later violence than they were in predicting reductions in later psychological distress, so it is likely that different patterns of resilience and risk need to be explored in relation to these two particular negative outcomes. The strongest resilience factors for both models were those that were measured at the individual level, and the psychological measures emerged as being particularly important. The youths more resilient to later violence self-identified as the least impulsive and were identified by their teachers as more prosocial. Having high self-esteem provided protection against later symptoms of anxiety and depression, especially among those who were victims of early bullying. Moreover, young people experiencing low social alienation, which taps into negative emotionality and a sense of isolation or marginalization, were at reduced risk of both violence and psychological distress at age 13 years. The effect of low social alienation was particularly important for the violence model, as high bullies at age 13–16 years who were most socially integrated were protected against later participation in violence; whereas, those who were socially alienated were at significantly increased risk of violence.

The family level factors had a stronger effect on violence than on psychological distress. Resilience to violence was predicted among those from stable family backgrounds, with high levels of parental supervision and low levels of parental conflict; whereas none of these factors significantly reduced the risk of psychological distress. Greater parental engagement with school during the teenage years did predict greater resilience to psychological distress, which indicates that those who experience bullying at school would benefit greatly from enhanced parent-teacher contact. On the whole, these findings indicate that school-based interventions are likely to be more effective in improving long-term outcomes where the family circumstances also engender a degree of resilience, particularly among those who bully others.

While community level variables had little impact within the models overall, it is notable that young people living in the least deprived parts of Edinburgh were at reduced risk of psychological distress. This suggests that, regardless of other background factors or experiences, the aggregate effects of living (and, by extension attending school) in a more economically advantaged area is a positively beneficial one on young people's long-term psychological adjustment. Neither of the socioeconomic measures at the family level was significant in either model, however.

Taken together, these findings indicate that experience of bullying in the early adolescent years has a strong and significant effect on later outcomes, even when controlling for a range of potentially protective factors. Those who are most engaged in bullying as perpetrators between ages 13 and

16 years were significantly more likely to be report being violent at age 17. The risk of engagement in violence is lower among girls, those with less impulsive personalities, children with prosocial skills, and those who experience good parental supervision and low parental conflict. Moreover, the impact of bullying on later violence is significantly reduced among those who are the least socially alienated or marginalized. All of this highlights the importance of good internal resources, stable and protective family ties, and strong and stable peer networks in reducing the risk of bullying behavior on later violence; and suggests that intervention strategies aimed at bullying reduction should strive to actively engage with parents on their modes of parenting and focus on developing positive peer networks and social relationships among those who bully.

Those most affected by bullying victimization between ages 13 to 16 years were at high risk of developing symptoms of psychological morbidity at age 17 years. However, the risk was reduced among boys and those with good self-esteem, low social alienation, parents who engage actively with the school system, and living in more affluent neighborhoods. Particular attention needs to be paid to victims of bullying with low self-esteem, as their risk of later psychological distress is far greater than for more self-confident victims.

Conclusion

This study set out to identify the impact of bullying during early adolescence on longer term outcomes, taking into account various potential resilience and protective factors at the individual, family and community level. Models testing the effect of bullying perpetration on later violence and bullying victimization on psychological distress highlighted that there were significant resilience factors to both of these outcomes at all three levels, but neither model was sufficient to partial out the effects of bullying. Both bullying perpetration and bullying victimization during the teenage years were strongly predictive of later negative outcomes at age 17, even when controlling for a range of other factors. The evidence presented here is indicative of a strong, cumulative and persistent effect of bullying experience during the school years on the later lives of young people, which is deserving of policy responses that implement early and effective interventions within schools. Preventive efforts are necessary to target young people who experience bullying as perpetrators and/or victims if we are to reduce adjustment problems in later adolescence that may well pave the way for further negative outcomes in adulthood. School-based interventions focused on positive mental reinforcement, improving social relationships and reducing social marginalization among young people may be particularly beneficial for bullies and victims alike.

COMPETING INTERESTS

The author has no competing interests.

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APPENDIX Logistic Regression Model for Bullying Perpetration: Predicting Probability of Participation in Violence at Age 17 (Odds Ratios)

	Stage 1		Stage 2		Stage 3	
Predictors	Exp(β)	95% CI	Exp(β)	95% CI	Exp(β)	95% CI
Bullying measure[a]						
High bully at age 13–16 years	3.78***	[3.13, 4.58]	2.31***	[1.81, 2.96]	2.54***	[1.96, 3.30]
Individual level resilience						
Female			0.45***	[0.35, 0.57]	0.45***	[0.35, 0.57]
High school attainment			0.82	[0.60, 1.12]	0.82	[0.60, 1.12]
Positive/prosocial attitudes			0.66**	[0.51, 0.86]	0.65**	[0.50, 0.85]
Low impulsivity			0.53***	[0.33, 0.74]	0.53***	[0.38, 0.73]
Low social alienation			0.61**	[0.44, 0.85]	0.77	[0.53, 1.11]
High self esteem			1.24	[0.93, 1.64]	1.23	[0.93, 1.64]
Family level resilience						
Parental interest in education			1.31	[0.98, 1.77]	1.30	[0.96, 1.75]
Parental supervision			0.50***	[0.36, 0.70]	0.50***	[0.36, 0.70]
Stable family structure			0.71**	[0.56, 0.90]	0.70**	[0.55, 0.90]
High socioeconomic status			0.85	[0.66, 1.09]	0.85	[0.66, 1.10]
Low eligibility free school meals			1.12	[0.80, 1.56]	1.13	[0.81, 1.58]
Infrequent parent–child conflict			0.66**	[0.50, 0.89]	0.65**	[0.48, 0.87]
Community level resilience						
Low economic deprivation			0.75*	[0.55, 1.03]	0.74*	[0.54, 1.01]
High neighborhood stability			0.88	[0.67, 1.14]	0.88	[0.67, 1.14]
Low neighborhood crime rate			0.86	[0.63, 1.17]	0.86	[0.63, 1.18]
Interaction effects[b]						
High bully at age 13–16 years by low social alienation					0.40*	[0.18, 0.90]
Observations	3,063		2,292		2,292	
Pseudo R^2 (Nagelkerke)	.093		.203		.206	

Note. Odds ratios (exponentiated logit coefficients) and 95% confidence intervals (in parentheses) reported.

[a]High bully at age 13–16 years = those in the upper quartile of a composite measure of bullying perpetration based on scales measured at each age.

[b]Only significant interaction effects reported.

*$p < .05$. **$p < .01$. ***$p < .001$.